Analysis of Ecuadorian Companies' Access to Financial Resources in the Context of the COVID-19 Sanitary Emergency and the Performance of Economic Areas

Ignacia de Jesús Luzuriaga Granda
Universidad Nacional de Loja

Fanny Yolanda González Vilela
Universidad Nacional de Loja

Yesenia Alexandra Briceño Luzuriaga
Universidad Nacional de Loja

John Patricio González Román
Universidad Técnica Particular de Loja

This article is developed within the context of the COVID 19 health epidemic, with the purpose of exploring the probability of access to credit in financial institutions properly registered by the Superintendency of Banks and the Superintendency of Popular and Solidarity Economy, using data from the 2019 Structured Business Survey and by means of logistic probability analysis in the economic sectors, being the commercial and manufacturing sectors those most likely to have access to credit, making them financially susceptible to the critical effects of the measures to contain the pandemic, being necessary to take measures ranging from governmental policies to the administrative policies of the company to mitigate the consequences.

Keywords: financing, companies, COVID 19, logit

INTRODUCTION

One year after the declaration of the global health crisis, the Ecuadorian economic entities are trying to overcome the uncertainty and difficulties caused by the restrictive measures and confinement adopted by the competent authorities, according to the Central Bank of Ecuador (2020), predicted the decrease in total demand for goods and services by 9.97% in 2020 compared to 2019, related to the decrease in wages in the public sector, increased unemployment, deteriorating expectations of investors and a contraction of 22% in remittances received from Italy, Spain and the United States.

In this sense, Peñarreta (2017) states that access to financing has a positive effect on the rise of new and consolidated companies. It is necessary to know the access to financing of Ecuadorian companies according to their economic sector and activities. The objective of this research is to identify the probability

that a company has access to credit according to the economic sector in which it operates, furthermore, we disaggregate the information by economic activities according to the data collected by the Ecuadorian Institute of Statistics and Census for the year 2019 using logit models, which Medina (2003) indicates are used to estimate a probability, in this case, that the economic sectors have access to external financing.

Among the main findings determined by the research, it shows that the economic sector with the highest probability of having credit is the commercial sector, being the sector that shows the greatest recovery. On the other hand, mining is the sector with the lowest probability of having external financing; likewise, at a disaggregated level, the health activity, finance/insurance and wholesale trade and less would be the activities with the highest probability of accessing credit for reactivation; the contribution of the research will help determine the economic sectors and activities that require both government and management policies to leverage their financing capacity and overcome the crisis.

The research is structured in five sections detailing the context of the study, the main and recent related studies, data and methodology used, and finally the conclusions and recommendations derived from the analysis.

LITERATURE REVIEW

The financing capital is indispensable in the business environment, especially for the development of investments in fixed capital or innovation, in this sense, Rojas (2017) mentions that in order to close the financing gaps between the different economic and productive agents, governments have entered to finance companies through development programs such as investment and innovation credit programs, development banking, bank guarantees or financing lines, assimilating the experience of other countries. In the regional case of the Southern Common Market, according to Martinez et al. (2018) applying a methodology of logit and probit regressions, in Argentina, Brazil and Uruguay, microenterprises of greater seniority and operating in the manufacturing sector are 53%, 47% and 38% respectively are more likely to access credit than other companies. While in Paraguay medium-sized companies operating in the manufacturing sector have a probability of 73% of obtaining external financing; Wellalage & Locke (2017) add the gender perspective when studying access to credit by analyzing the determinants of financing in women-led ventures using probit regressions methodology, they indicate that women entrepreneurs have 3% less access to credit compared to men.

At the national level, Portal et al. (2018) and Belén et al. (2017) analyze the determinants of microenterprise external financing and access to bank financing of high-tech SMEs respectively, using a multivariate statistical technique of groups in which they conclude partially agreeing that the characteristics of microenterprises and the profile of the owner are determinants in accessing credit, in the first case, access to external financing those companies that have a greater number of workers and quality young owners considering their higher schooling and experience, on the other hand for Belén et al. (2017) qualities are not determinant in obtaining credit for high-tech companies; León et al. (2015) as well as Wellalage & Locke (2017) in the Peruvian case, using a probit model, mention that gender matters when accessing a loan, they also highlight that manufacturing companies with greater seniority are the most likely to have access to a loan.

Deepening further in our study field, the Ecuadorian environment, Delgado & Chávez (2018) indicate that the main sources of financing are bank credit and own funds however very few manage to access credit, which implies their premature closure; Franco et al. (2019) using a probit and logit methodology, with data from the three main provinces of the country, Guayas, Pichincha and Azuay, determine that there are between 28% and 56% that a medium-sized company has a higher probability of obtaining a loan, confirming also a relationship between economic activity and obtaining a loan, being the food and trade activities the most likely to obtain it, ignoring the other provinces of the country and other economic activities considered by the official statistics.

DATA AND METHODOLOGY

Data Used

In order to analyze access to credit in financial institutions of Ecuadorian companies according to the sector and economic activity in which they operate, we use data from the 2019 Business Structural Survey, collected from 3526 companies by the Ecuadorian Institute of Statistics and Census, as shown in Table 1, the dependent variable is access to financing, while, the independent variable in the first case, refers to economic sectors and in the second case to the productive activities of the Ecuadorian economy; The control variables are the level of assets and capital ownership, used to establish a better adjustment of the results with the intervention of factors when requesting financing.

TABLE 1
DESCRIPTION OF THE VARIABLES

Name	Definition	Type of Variable
Access to financing	Expresses whether the company had a line of credit with a financial institution.	Dichotomous variable
Economic Sectors	Describes the economic sectors such as: commerce, construction, manufacturing, mining and services.	Nominal categorical variable
Economic Activities	Describes the economic activities into which the economic sectors are divided.	Nominal categorical variable
Total Assets (log)	Tangible and intangible fixed assets year 2019 - Value of total assets of the company.	Expressed in U.S. dollars.
Capital Ownership	Describes the ownership of capital in companies: private, public and mixed.	Nominal categorical variable

Note: Dictionary of variables of the Structural Business Survey (2019).

According to Ordóñez et al. (2020) the financial system plays an important role in the world economy, in the Ecuadorian economy it is necessary to recognize its composition and the factors that affect the dynamics of each sector and its growth, i.e. the financial sector in Figure 1 indicates that at national level 63% of the business sector has financing from a financial institution, whether private, public, cooperative, mutual, among others; having a moderate access by companies to some type of external financing
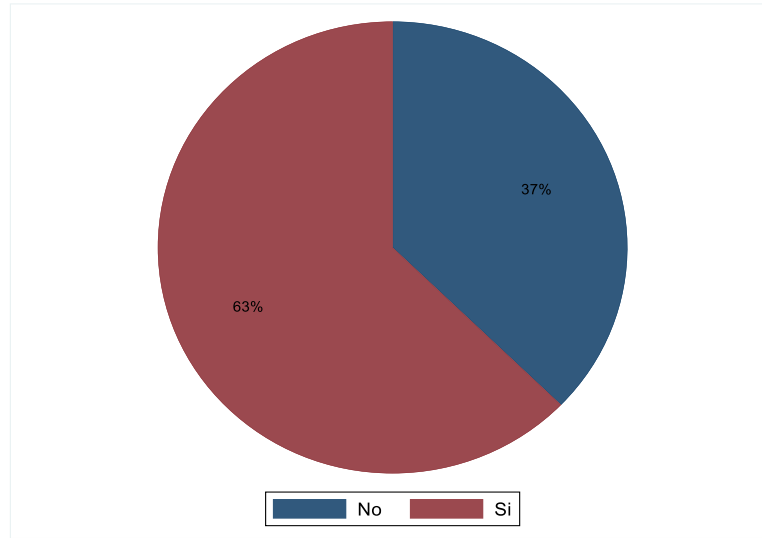
FIGURE 1
ACCESS TO FINANCING

Figure 2 shows that the largest number of companies with financing are located in the provinces of Guayas and Pichincha, that is, in the most important cities with the largest number of companies. The province of Guayas concentrates most of the companies, as it is the country's main port for the export and import of raw materials and finished products, and there is a high level of economic movement; the province of Pichincha concentrates public administration activities as it is the province of the capital of the country, in addition to great commercial movement and high demand for professional services, far below are Azuay, Manabí and El Oro, which in comparison with the two previous provinces have a low concentration of companies, with great economic dynamics promoted mainly by industrial activities in the case of Azuay and Tungurahua, and commercial activities in the case of Manabí and El Oro.

FIGURE 2
**EXTERNALLY FINANCED COMPANIES BY PROVINCE**
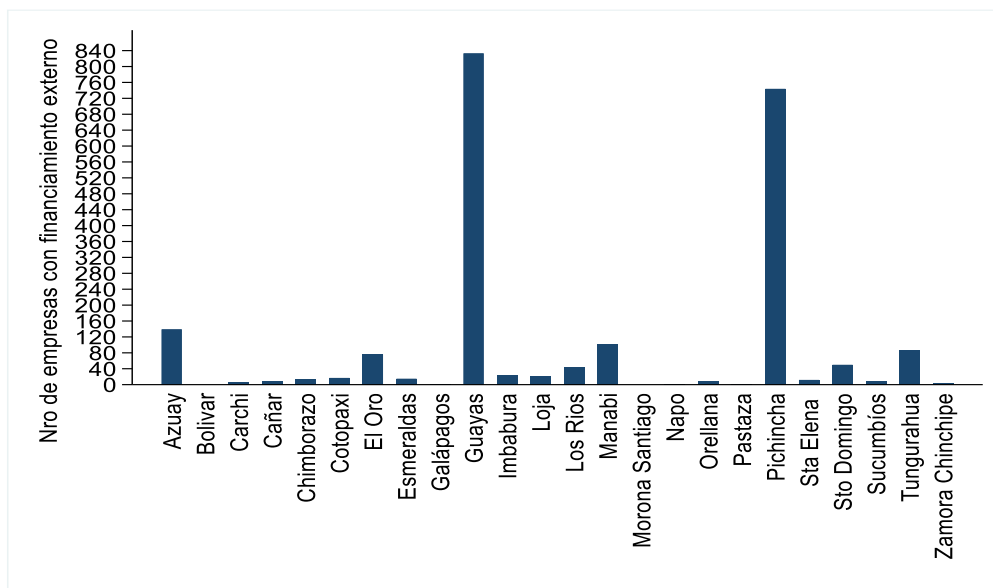
According to data from the Central Bank of Ecuador and in accordance with the Monetary and Financial Policy and Regulation Board in its resolution 603-2020-F, Table 2 shows the maximum lending interest rates by segment for the private, public and popular and solidarity financial sector; it can be observed that the more complex the organizational structure of the company, the lower the maximum interest rate, likewise, for companies or companies with sales of less than $ 100,000 or small-scale activities a higher interest rate is perceived than the other segments.

TABLE 2
DESCRIPTION OF MAXIMUM INTEREST RATES

| Segment	% per year
Corporate Product	9.33
Business Product	10.21
Productive SMEs	11.83
Retail Microcredit	28.50
Simple Accumulation Microcredit	25.50
Extended Accumulation Microloans	23.50
Public Investment	9.33

According to the Ecuadorian Institute of Statistics and Census (2020), for the official analysis there are five economic sectors which are manufacturing, mining, commerce, construction and services; in the Ecuadorian economy 42.60% of establishments are dedicated to commerce, 29.52% are dedicated to services, 19.12% to manufacturing, 5.81% to construction and 2. 95% to mining, however, the economic returns are not explained by the number of establishments, as shown in Table 3, since the sector with the highest average sales level is mining with approximately 67 million dollars, followed by manufacturing industry with 42 million, commerce with 26 million, construction with 3.5 million and services with one million dollars.

FIGURE 3
AVERAGE LEVEL OF SALES BY ECONOMIC SECTOR
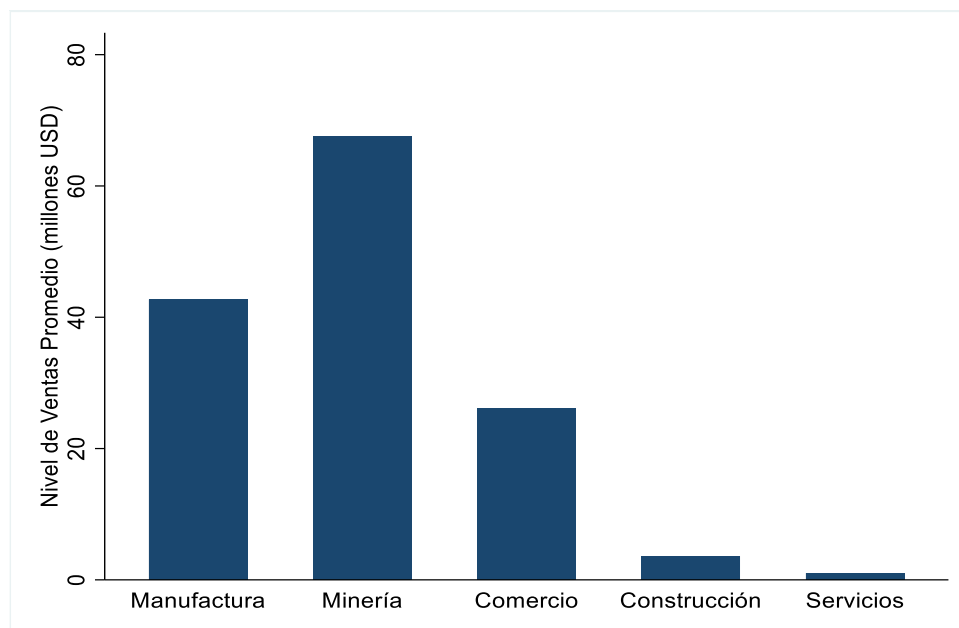
The economic sectors, as shown in Figure 4, are divided into 17 economic activities, among which mining and quarrying, manufacturing, wholesale and retail trade and repair of motor vehicles and motorcycles stand out; to a lesser extent, construction and information-communication stand out.

FIGURE 4
AVERAGE LEVEL OF SALES BY ECONOMIC ACTIVITIES
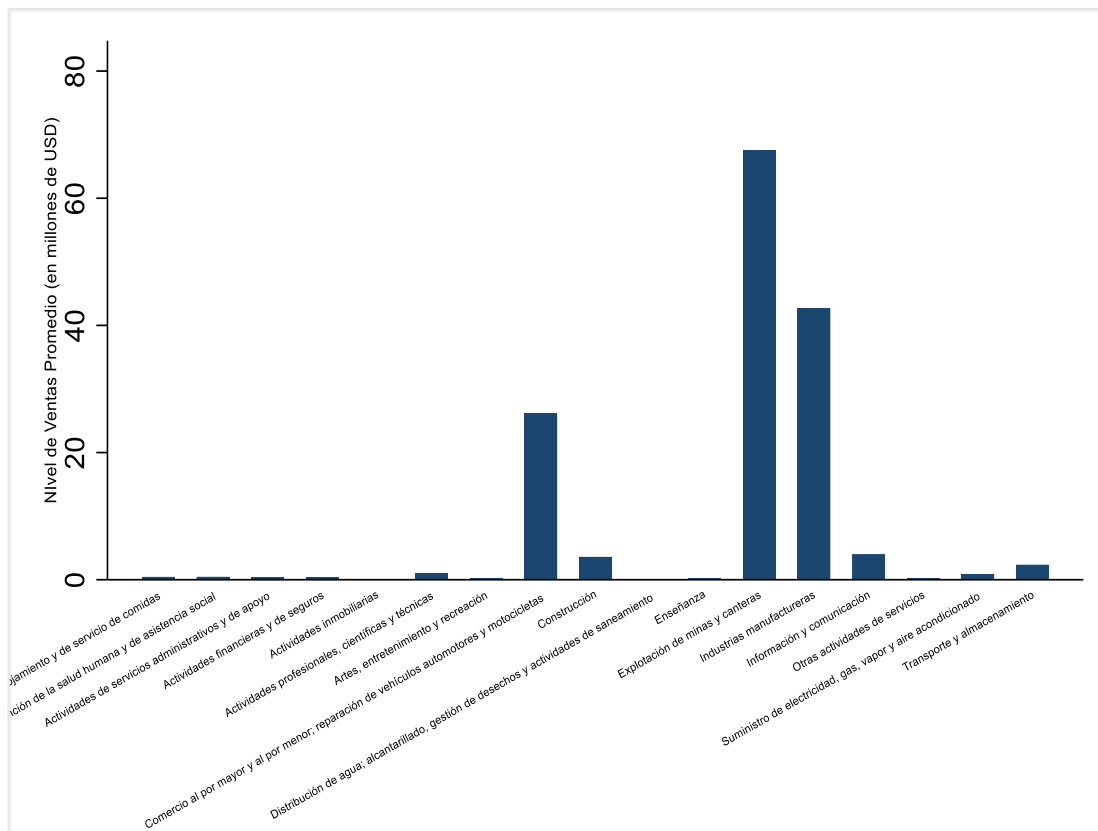
Methodological Basis

The present research methodology is descriptive, analytical and econometric to know the characteristics and state of financing of Ecuadorian companies in 2019, a logistic probability or logit model suggested by Medina (2003) is used, according to Gujarati & Porter (2010) and the logit model is suitable for the analysis of binary choices, that is, when the dependent variable is dichotomous in which the two possible outcomes are 1 and 0, being this the logarithm of the odds ratio, the best option when it comes to analyze individual cases or at the microeconomic level, the logistic probability model is defined in the following distribution function of equation 1.

$$P\left(Y = \frac{1}{X_i}\right) = \frac{1}{1 - e^{Zi}} \tag{1}$$

where $Y_i = 1$: has financing, $Y_i = 0$: does not have financing, X_i: sectors or economic activities, $P\left(Y = \frac{1}{X_i}\right)$: probability of having accessed external financing, Z_i: exponent of the exponential which is a linear regression. When the distribution function is linearized, equation 2 is observed.

$$Z_i = \beta_0 + \beta_1 X_i + \mu \tag{2}$$

where Z_i: exponent of the exponential which is a linear regression, $\beta 0$ is the intercept of the curve, β_1 is the slope of the curve and μ is the stochastic error.

RESULTS AND DISCUSSION

The results shown in Table 3 indicate that the model of access to credit by economic sector at the global level is significant, as shown by its value of Prob>chi^2=0.0000, i.e., less than 0.05; according to Franco et al. (2019) also access to credit is determined in addition to the economic sector, by company size, employee training, use of ICTs, shareholder concentration, management experience, company age, level of sales, export and product quality. As manifested by Franco et al. (2019), the economic sector with the highest probability of accessing external or bank financing is trade, in relation to this it is observed that the construction sector has 3.06 times less likely to access credit, the manufacturing sector has 1.25 times less likely to access, on the other hand the mining sector has 2.24 times less probability of accessing credit, and finally the service sector companies have 2.19 times less probability of accessing financing in a financial institution, additionally it also indicates that if the company has a greater number of assets, it is more likely to access financing in a financial institution. Differences are evidenced in the cases of MERCOSUR which according to Martinez et al. (2018) and León et al. (2015) in which financing was concentrated by manufacturing companies, and also to Belén et al. (2017) which indicates that external financing is mainly used by high-tech companies, which is a reflection of the Ecuadorian economic structure based on trade in goods.

TABLE 3
LOGIT MODEL OF ACCESS TO CREDIT BY ECONOMIC SECTORS

Variable	Feature	Coefficient	Odd-Ratio	Probability	Base
Total Assets (log)		0.1617	1.1175	0.000	
Sector					Commerce
	Construction	-1.1844	0.3268	0.000	
	Manufacturing	-0.2195	0.8029	0.042	
	Mining	-0.8040	0.4474	0.000	
	Services	-0.7855	0.4559	0.000	
Capital Ownership					Private
	Public	-1.6503	0.1920	0.000	
	Mixed	0.2017	1.2234	0.588	
Remarks	3519				
Prob > chi^2	0.0000				

We can also highlight the case of the mining activity, which being the activity with the highest average sales, operates in most cases with its own capital, due to the fact that it has a series of stricter state and administrative regulations at the time of starting operations, in addition to having a large amount of foreign investment support; on the other hand, commercial companies depend on the constant flow of cash and also on a large liquidity, in order to meet their obligations with suppliers, human talent, payables, obligations with public institutions, within the framework of the sanitary emergency and the mobility restriction and confinement measures, commercial companies are the most likely to generate higher financial expenses due to moratorium or debt restructuring with financial institutions, reducing their future resources to innovate or venture into digital and virtual commercialization. In the case of the manufacturing sector, this is another sector that would be severely affected, since the high probability of a manufacturing company having a loan and the impossibility of operating normally would also mean a significant loss, since many

of the resources are already invested in raw materials and fixed assets, in addition to the obligations acquired beforehand; for both cases, i.e. commercial and manufacturing companies, the decrease in demand would add to the delicate economic situation that the Ecuadorian economy was already going through and the increase in prices in their inventories due to the withdrawal of fuel subsidies, complicating their situation and thus the possibility of meeting their obligations to obtain more financing.

Regarding the construction, mining and services sectors, which are sectors with a lower probability of having a credit and being the services sector the fastest to adapt to the new normality, they would have most of their resources free to face the crisis and eventually resort to bank financing.

Additionally, Table 4 shows the probability of access to credit by economic activities, which are disaggregated levels of the economic sectors analyzed above, in this case it is identified that seven of seventeen economic activities are significant at the time of acquiring a credit; considered with respect to the activity of accommodation and hospitality, activities such as health, financial and insurance services, professional services, wholesale and retail trade, water and sewerage and manufacturing have a statistically significant probability of accessing a credit, so they are activities that require large amounts of investment and working capital on a large scale.

TABLE 4
LOGIT MODEL OF ACCESS TO CREDIT BY ECONOMIC ACTIVITY

Variable	Features	Coefficient	Odd-Ratio	Probability	Base
Total Assets (log)		0.1755	1.1919	0.000	
					Lodging
Business Activity	Health	0.2206	3.0217	0.000	
	Administrative Services	0.0902	1.0944	0.849	
	Finance and Insurance	1.6418	5.1645	0.000	
	Real Estate	0.3235	1.3819	0.193	
	Professionals	0.8989	2.4569	0.000	
	Arts and Entertainment	0.5174	1.6777	0.042	
	Wholesale and Retail Trade	1.0304	2.8023	0.002	
	Construction	0.3305	1.3917	0.282	
	Water and Sewerage	-0.9059	0.4041	0.014	
	Education	0.4510	1.5699	0.184	
	Mining and quarrying	0.4337	1.5430	0.132	
	Manufacturing	0.4971	1.6440	0.070	
	Information and communication	0.0490	1.0502	0.864	
	Other services	0.0209	1.0211	0.940	
	Energy supply	-0.3125	0.7315	0.414	
	Transportation and storage	0.3872	1.4728	0.321	
Equity Ownership					Private
	Public	-2.1274	0.1191	0.000	
	Mixed	0.2026	1.2246	0.588	
Remarks	3519				
Prob > chi 2	0.0000				
Pseudo R2	0.0559				

CONCLUSIONS

The economic structure of each country has a direct relationship with the demand for financing in the economic sectors, however, it should be emphasized that mining, despite being the economic sector that has generated the highest sales on average in 2019, is more likely to use its own funds, most of which are foreign capital; this research aims to analyze the characteristics of access to credit for each sector and economic activity, Among the main results is that it is the commercial sector that has made most use of external financing, which differs from the results presented in emerging economies such as Brazil, Argentina, Uruguay and Paraguay, which rely on the manufacturing sector. Among the disaggregated economic activities that resort to bank loans are commerce, health, professional services, manufacturing, financial services, and financial services.

It is assumed that a greater credit impact on the Ecuadorian commercial sector that has had problems to adapt to the virtuality and restrictions of the new normality, unlike other activities that have been able to opt for teleworking or in turn, the demand for their services have increased during the current health crisis, it is necessary that the relevant government entities establish legal or administrative measures to help companies to maintain adequate liquidity such as moratoriums, suspensions of debtor dues that mitigate the credit crisis in this activity without significantly deteriorating the financial stability of the national economy; Likewise, company managers will establish internal policies in each company that will allow them to have the necessary resources to comply with their employer, tax and operational obligations, dispensing with expenses that are not extremely necessary and making use of mobile and virtual technologies to provide better quality products and services.

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